Abstract

Wood-Firing in America:

Wood-Fired Utilitarian Ware for Serving Japanese and American Food

by

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July 2011

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In this body of work, my focus is on the surface and color of wood-fired ergonomic utilitarian ware. The natural-ash glazed surface and soft color changes from the atmospheric nature of wood firing are the principle aim of my firing. I intend for my wood fired work to be used on the table, in the kitchen, and around the home in both the United States and Japan on a daily basis. Food cultures between the United States and Japan are very different, and the ware used in both cultures is not the same, but similar. By approaching both food cultures from the similarities, I can be aware of the needs in the ware to be used in both food cultures. The surface and subtle color variation in my wood-fired work accompany the colors of both Japanese and American food presented at the table. Wood-fired work can be suitable for serving cross-cultural foods.

WOOD-FIRING IN AMERICA:
WOOD-FIRED UTILITARIAN WARE FOR SERVING JAPANESE AND AMERICAN FOOD

A Report of a Creative Thesis

Presented to

The Faculty of the School of Art and Design

East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Master of Fine Arts in Ceramics

by

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INTRODUCTION

Growing up in Japan and studying ceramics in the United States gave me a more unique perspective than others. Getting to know a different culture made me re-recognize my own culture with a different perspective. I discovered that food culture is one of the biggest differences I have experienced. It was very strange for me not to eat rice in my own rice bowl, at first. The food eaten in the United States is different than in Japan, as well as the environment surrounding the food. As I began to understand the American food culture, I started to recognize the cultural differences on the table. I began to think about making work that can be used in both Japanese and American food culture.

I intend my wood-fired work to be used on a daily basis. Wood-firing is possibly one of the most labor intensive firings. While continuing to make creative work in the studio, potters are required to gather, cut, split, and stack wood. All aspects of wood preparation take time and energy, but are also very necessary. Ideally the wood should be split and dried for at least three months prior to the firing because wet wood takes much more time to combust and does not give enough energy to raise the temperature in the kiln.

Loading a wood kiln is also labor intensive and time consuming. The wood kiln at ECU usually takes me two days to load. The loading and stacking of the work all takes place in an environment where one cannot stand up. Since the placement and interrelationship of the works in the kiln determine the flow of the flame and directly affect the results, it is as if I am working on a jigsaw puzzle.

Firing the kiln takes usually three to five days and is a struggle against the intense heat, especially toward the end of the firing when the temperature of the kiln exceeds 2400ºF. Although

this traditional firing takes longer than other types of firing, the distinct results can be achieved only from the wood-firing. The length of the firing varies depending on the size of the kiln; it usually ranges three to five days. Cooling the kiln is a part of the process and is as important as the firing. If the kiln is cooled too fast, work in the kiln will crack from thermal shocks. It is often said that the length of time for cooling the kiln should be at least the same as the length of time used for firing.

PLATE 1 “STACKED WOOD AND HYDRAULIC LOG SPLITTER”

BIZEN AND SHIGARAKI

While growing up in Hiroshima, Japan, I was exposed to traditional pottery. Bizen ware and Shigaraki ware are known as traditional wood-fired pottery in Japan. These are two of the six types of oldest pottery; the other four are Echizen ware, Tanba Tachikui ware, Tokoname ware, and Seto ware. Both Bizen ware and Shigaraki ware have significance in their unique clay bodies. Bizen ware is known for its iron rich clay that results in dark colored surface. In contrast, Shigaraki clay is white and does not have much iron in it; however, Shigaraki clay is known for its roughness. The clay has coarse sand and is not easy to handle on a pottery wheel. Shigaraki clay contains feldspathic rocks that melt on the surface and leave white glossy (round or spherical) spots. Shigaraki clay suits the making of big pots.

When people who are familiar with Japanese ceramics speak about Bizen ware, they might remember unglazed dark brown pots. The darkness of the pots is from the iron in the clay Bizen potters use. Firing unglazed pots in a wood kiln is called *yakishime*, and that literally means "firing to vitrify". These unglazed dark brown pots are characteristic of Bizen pottery; however, there are other types of Bizen wares. There are four main types of results in Bizen ware. They are called *hidasuki*, *goma*, *sangiri*, and *yohen*. *Hidasuki*, known as red stripes, has red lines on a white surface. When Bizen potters, out of necessity, fire a pot in another pot or stack pots to avoid wasting space in the kiln, they put rice straw between pots to prevent them from sticking to each other. While rice straw ash that is high in silicone oxide acts as a refractory substance that keeps pots from sticking together, minerals from the rice straw react with the surface of the clay and turn it red. Another example is referred to as *goma*, or sesame seeds. The surface of the pots looks like spread sesame seed paste. Ash from the red pine that the potters use as fuel

accumulates on pots and melts on the surface. When the ash becomes like a paste of sesame seeds, it is called *goma*. *Sangiri* pots are found when the pots are placed where the wall divides the kiln chambers, called *san*. When firewood falls onto a pot or a pot is buried in the coals, local atmospheric reduction happens due to lack of oxygen where the wood touched the pot. The surface produced is gray, black, red, blue, gold, or silver colors and is called *sangiri*. Although the definition of *yohen* is ambiguous, it is a little bit different from the other three types of results listed above. *Yohen* literally means kiln effects. These effects most likely happen accidentally; some people would say "happy accidents." The kiln effects from the firing can be produced intentionally and nowadays potters are seeking to create this accident. Originally the accident was caused from the manner in which the pots were stacked in the kiln to save space. *Botamochi*, a sweet treat that has sticky rice inside of adzuki bean paste, is a mark from putting a pot or pots onto another pot that is flat. Wadding from the pot on top leaves a circular mark that looks like a *botamochi* on the bottom pot. *Fuseyaki,* or covered firing, is another technique to utilize the limited kiln space. A cup or a bowl is placed upside down onto another pot, such as a bottle. While the pot is covered, where ash does not hit remains plain as opposed to the surface ash hits. ("Bizen Kiln Changes.")

Interest in Bizen pottery began to decline when porcelain was introduced into Japan in the Meiji Era. However, Bizen ware became popular again when Toyo Kaneshige (not Jin Yang Tao), who eventually became a living national treasure of Japan in Bizen pottery, led a renaissance in Bizen during the Showa Era. He devoted himself to the reconstruction of Kobizen (old Bizen ware) from the Momoyama Period For its pure beauty, Bizen pottery is displayed as art to be looked at. However, Bizen pottery is meant for use and its true value can be found in use. ("The History of Ceramics.")

The firing method in Shigaraki is a little bit different from that in Bizen. Since Shigaraki clay is poor in iron, the vitrification temperature is extremely high. Therefore, Shigaraki potters need to fire their pots at high temperatures for a long time. When Shigaraki clay is fired, small amounts of iron in the clay body react with ash and produce an orange surface. *Yohen* is also appreciated in Shigaraki ware.

There are mainly two types of kilns used in both Bizen and Shigaraki: one is called *anagama* and the other is *noborigama*. *Anagama* is the closest to an ancient kiln and the name stems from how it was originally built. The kiln was a dug hole or cave (*ana*) that was hardened by firing the kiln. It was impossible to repair the kiln, and often the ceiling collapsed due to its nature, and they had to start building again from the ground up. To make the kiln last longer, they began to make bricks, and were able to maintain the kiln.

Anagama is not an efficient kiln for those who want to fire a lot of pots at once. Since it is a one-chamber kiln shaped like a half round tube, heat produced in the firebox goes through the ware and out of the chimney without having convection. However, pots in *anagama* have tendency to get *yohen* since ash directly hits the pots. *Noborigama* came after *anagama* and has better fuel efficiency. Usually *noborigama* has divided multiple chambers and a firebox. Ware chambers are big so that they can fire thousands of pots at once. It is understood that a lot of *noborigama* were built when there was lot of demand for pottery (Furutani 15).

MATERIALS AND METHODS

Clay for Wood-Firing

Different clay bodies bring different results in wood-firing. The way a kiln is fired affects the results within a clay body. Ancient Japanese potters utilized the limited kiln space by stacking pots. Firing as many pots as they could in one firing, brought a lot of different results including *yohen*. This effect can be achieved easily by repeating the manner in which each pot is stacked; however, it is difficult to appreciate the meaning and value of *yohen* unless one actually performs this creative process.

I chose a clay body specifically formulated for wood-firing. Needless to say, clay is the major material used in pottery. It is especially important for wood-firing, since the exterior of the work is going to be left unglazed. I rely on the clay body to glaze itself through the reaction with the ash during the firing. The Clay body determines the results of the firing and mixing. My own clay body enables me to have more control over the finish of my work. As mentioned, clay body is crucial to the effects attained in wood-firing. I formulated my own clay body like other contemporary potters formulate glazes.

In this body of work, I am using a white stoneware body that gives a variety in color and surface. It is also a very plastic clay body that is easy to throw. Some porcelain bodies look attractive when fired in the wood kiln; however, porcelain has more of a tendency to warp than stoneware in the kiln. To prevent porcelain from warping in the wood kiln, it needs to be thrown thicker than I prefer. Typically, white stoneware has a higher heat capacity since it has relatively low iron content. Iron in the reduction atmosphere works as a flux. This white stoneware has Nepheline Syenite, which has a lower melting point and is a stronger flux, in order to achieve

more glazed surface area. The White stoneware I use is formulated with Helmer Kaolin. Helmer Kaolin works as a “flashing” component in the clay. Helmer Kaolin, when fired in the wood kiln, provides red, pink, and orange color from the reaction with the ash; this is known as flashing. Adding XX Sagger ball clay makes the clay plastic, which means the clay has more workability. XX Sagger is also known as a flashing substance in wood-firing. . Using these materials, I make a clay body that helps produce the results I desire in wood-firing.

Glaze

It is necessary to glaze some of my work for it to complement with both Japanese and American food cultures. I usually place glazed works in the back of the kiln where they do not get as hot or as much ash deposit as they would if they were placed in the front. When the ash reacts with the glaze, often the ash takes effect as a flux and makes the glaze run. The glaze will stick to the wadding or, in worst-case scenario, to the kiln shelf. The wood kiln cannot be fired with work only loaded in the front, some work needs to be loaded in the back of the kiln as well.

In American food culture, the roughness of the unglazed surface would scratch the silverware and could damage it. Silverware will also leave black lines on the surface and make unpleasant noises. For my work, I have chosen a Shino glaze that suits the wood-firing. After testing many Shino glazes, I selected the one that can complement the color of my wood-fired work. This Shino turns cream color, gold, brown, or red, depending on the placement in the kiln and it can be used on the exterior of my work. This Shino does not run even when it gets hot in the kiln and reacts with ash. Sometimes, the ash will even make the glaze translucent or speckled. I have avoided using the Shinos that crawl. Crawling happens when the glaze shrinks

much more than the clay. The crawled surface is not suitable for eating food since it is hard to get food out of the glaze gaps when eating with silverware, and also when cleaning it.

Kiln

Different kilns provide different results. Different kilns also require different techniques to fire. There are many factors that determine the results of the firing, but using the same kiln every time does not provide the same results. I was very lucky to use two different kilns while at ECU. The wood kiln at ECU is the primary kiln that I fire. I have been fascinated with the results I can get from this kiln. The design of the kiln is similar to the *anagama* kiln. It is not a fuel-efficient type of kiln and takes a lot of wood to fire usually as much as five to six cords of wood in order to fire above cone 10 throughout the kiln.

The other kiln I was able to fire was a kiln in Snow Hill, NC, owned by Ms. Vicky Smith, who is a former graduate student in ceramics at ECU. This kiln has two chambers for ware that are separate from the firebox. This two-chambered wood kiln is very fuel-efficient compared to the one at ECU. It enabled an effortless firing. The front chamber of this kiln is a wood-firing chamber and the back is a wood/salt-firing chamber. Salt is introduced when the back chamber reaches cone 8. When salt is exposed to the high temperature in the kiln, it breaks down to sodium and chlorine molecules. Sodium ions react with clay and create a glazed surface. The mixture of the wood-firing and salt firing results makes the work look distinct and interesting.

I chose to fire my thesis work in the kiln at ECU. Although it takes two additional days to fire this kiln, my work achieves the effects I desire. The amount of ash is in direct proportion to the amount of wood used in the firing. To achieve a glazed surface from the atmospheric nature of the wood-firing, I think that a long firing is appropriate for my objective.

Kiln Modifications

Prior to the firing, the kiln was modified for my thesis. The kiln was modified to be more efficient.

Chimney

I rebuilt the top of the chimney to accommodate standardized kiln shelves that are used for dampers. The chimney was made narrower and taller. This thin and tall chimney will pull more air through the kiln, and the more air drawn into the kiln the more efficient the firing will be.

Sutema

The very back section of the kiln is blocked with a brick wall to make the kiln smaller and to have *sutema* or waste space. The wall between the ware chamber and the chimney that creates *sutema* helps the flame stay in the ware chamber as a cushion, instead of letting it out from the chimney. This enables us to fire the kiln in a shorter length of time and with fewer people.

Kiln Floor

The back half of the kiln floor was raised. The top part of the kiln is always hotter than the bottom. This modification makes it easier to fire the whole kiln evenly. By raising the floor, the kiln gains more of a slope and the temperature will rise easier in the back, because heat rises. This eliminates one of the colder spaces in the kiln.

PLATE 2 “KILN INTERIOR”

The raised floor and the wall between the ware chamber and *sutema* can be seen.

PLATE 3 “MODIFIED CHIMNEY DURING THE FIRING”

Firing the Wood Kiln

Loading the Kiln

Loading the work in the kiln determines the results. Is the work going to be in the back or front, bottom shelf or top shelf or middle? Which side is going to face the firebox? Thinking of the flow of the flame and the deposit of ash is the main concern when I load the kiln. For example, the wood kiln at ECU has a main firebox in the front and small fireboxes on the sides for side stoking. If the work is too close to the firebox, there will be too much ash and results in having a rough surface, just like a sandpaper, with unmelted ash. When loading the kiln, I follow the practice of ancient Japanese potters by placing as many work as possible in it. It sometimes requires tumble-stacking technique. I load glazed work toward the back of the kiln because glaze becomes more fluid when ash hits it. Once glaze melts and runs, grinding is required to remove the glaze left on the kiln shelf. To prevent this, glazed work is put toward the back. The very front part of the kiln is not loaded to the ceiling. Approximately one fourth to two fifth in height is left open. The room left on the top will help the wood combust better and let the ash fly onto the pots.

PLATE 4 “LOADING THE BACK OF THE KILN”

PLATE 5 “LOADING THE FRONT OF THE KILN”

Firing the Kiln

The beginning of the firing is the most important part of the firing. It is crucial to start very slow to prevent any cracks or blowups by getting rid of both physical water and chemical water in the pots. The slower the firing goes at the beginning, the easier it gets toward the end. There will be less of a temperature difference between the front and the back. A small campfire is kept in the firebox for at least twenty-four hours for this process. Once the kiln is warmed up, more wood is introduced into the kiln to raise the temperature. It is still required to raise the temperature gradually to prevent the pots from cracking. By the time the front of the kiln glows in dull red, the back of the kiln is warmed up enough for the temperature to be increased (Furutani 126-129).

Side stoking is started as soon as flame from the main firebox is seen from the side stoke hole. By starting side stoking at the early stage, the temperature difference between the front and the back can be decreased. This also reduces the length of the firing since there is not much catch-up side stoke necessary. When the front of the kiln reaches the body reduction temperature, cone 08, some primary air holes are closed to reduce the atmosphere. The smoke from the chimney is the barometer of the reduction. When the smoke is black with carbon, the kiln lacks oxygen. The kiln is kept in mild reduction that produces grayer smoke. When the firing is close to the end, the process of firing called "*Semedaki*", which means aggressive stoking, is initialized. The timing of the stoking is determined by the flame that comes out of the small holes on the top of the kiln. This design is seen in the kiln built by Roppo Tamura who is one of the authors of the book "Building Your Own Kiln: Three Japanese Potters Give Advice and Instructions." When new wood is stoked, while the flame is still shooting out of the hole, the atmosphere of the kiln is in reduction, if the wood is stoked when the flames die down, it is in

neutral, if the stoking occurs after five seconds, it will be in oxidation (Itabshi, Tamura, and Kawabuchi 70). When the kiln is in reduction, it is hard to raise the temperature because the temperature of the kiln drops when new wood is introduced. As the wood burns, the temperature goes back up. More wood is introduced into the kiln to maintain the flame through the top holes until the end of the firing.

Toward the end of the firing, usually the back of the kiln is not hot enough for ash to melt although the front of the kiln is getting too hot. Then some primary or secondary holes or both levels of holes are closed. This action will let more air to be drawn from the side air holes. This will raise the temperature in the back. The wood is stoked more often to maintain the coals high in the side firebox. The rule to raise the temperature is "less wood more often." This is what I always keep in mind when I fire a wood kiln.

Firewood is introduced into the kiln every one minute to fifteen minutes depending on the speed of combustion. At the beginning of the firing the wood stoked into the firebox combusts very slow. As the kiln gets hotter, the wood burns much faster. However, stoking more wood does not mean that the kiln will get hotter. Often stoking too much wood will result in dropping the temperature. This is called "choking the kiln". The combustion speed becomes slower because there is too much fuel in the kiln. There is simply not enough oxygen for the efficient combustion; the atmosphere in the kiln is heavy reduction. Although the kiln is choked, firewood needs to be stoked. By changing the stoking pattern to "less wood more often" as the kiln gets hotter, choking can be prevented. By stoking less wood every time more often, the temperature drop from reduction atmosphere can be minimized. Stoking must be done as fast as possible because when the door is opened, cold air is drawn into the kiln. The temperature of the kiln can be dropped nearly 100ºF from leaving the door open.

When the back of the kiln reaches cone 10, the kiln is ready to be shut down. After the last stoking, the main stoke hole is plugged with soft bricks. The gaps between the bricks are covered with sloppy clay. Handful of clay is thrown against the gap. When the gaps are covered, the door is placed over the bricked hole. By the time this process is done, the atmosphere in the kiln is clear with no fly ash. The way a kiln down is shut down affects the results of the firing. The primary air holes, secondary air holes, dampers and top holes are closed at this point. It is important to have the kiln very hot when it is shut down, or the work becomes rough. If the kiln is shut down when ash is still flying in the kiln, the work becomes sandy and rough. The amount of the coals in the kiln affects the results as well. The coals will reduce the atmosphere in the kiln once all openings are closed since the coals will still burn in the kiln with little oxygen. In addition, the coals will help the kiln cool slower. Slow cooling is as important as slow start in order to prevent cracking from cooling too quickly. Slow cooling helps the color development and crystal growth in some glazes. It takes at least three full days, depending on the outside temperature, to cool down for unloading.

MY WORK AND FOOD

My work is produced while taking into consideration utility, such as ergonomic comfort, storability, and durability. It is essential for me to think how my work would be used, from the cupboard to the dining table.

American dining culture is interesting to me. America is a melting pot, and there are disparate food cultures. I have been in the southern United States for eight years and during that time I have been exposed to the distinct southern food. The experiences are valuable to me when it comes to making work. The biggest difference between Japanese and American food cultures in dishware is the use of dinner plates. It is not common to have more than one food on one dish in Japanese food culture. Each food has its own small dish. As a result, a lot of small dishes of food are served for individuals at the dining table. Although American dining culture has broadened my point of view in terms of the form and the subject matter of my creation, I still follow the fundamental idea of Japanese ceramic tradition that indicates that work should be simple and made for use. My work consists of creating a simple design that retains the idea of *kinoubi,* the foundation of Japanese art that equates function with beauty. My concept of design is focused on utility and functionality. In other words, the function of my work is utility. With this basic idea, my work can accommodate the serving of American food.

My work is designed for serving specific foods and I have chosen a few types of food from Japanese and American culture to be used as examples. I believe that no matter what food is served, the true value of my work is found when it is used on the table as serving ware while simultaneously complementing silverware, washed in the sink or dishwasher, and stored in the cabinet. The eating experience from using my work on the table will enhance its owner's daily

routines. The varied color from the atmospheric nature of wood-firing becomes delightful for users and this user-friendly work will help their routine flow better. Utility and functionality are the words I always keep in my mind. Criteria for my work are comfort, durability, and usefulness. My work should be able to be used at home on a daily basis. It must have a level of comfort and beauty that makes the user want to use it repeatedly.

Utilitarian pottery spends most of its life in the dish cabinet. In my experience while growing up in Japan, I observed that storage is an important factor when people choose their utilitarian ware because space is very limited. It can be stacked and stored in the cabinet with other pots before placing it on the table again.

For me, durability is an important part of functionality. In general, pottery can be broken while being washed in a sink. Getting rid of decorative elements that could be easily broken is the solution for this.

Bowls

Chawan (Rice Bowls)

Chawan is the word for tea bowl in Japanese. However, the word *chawan* is commonly used for rice bowls. Each family member has his or her own *chawan* to use on the dining table. It is not normal to let others use the bowl; even guests in the house use a bowl prepared especially for guests. The rice bowl form is different from soup bowls because chopsticks are used to eat rice. The rice bowl is made with a small bottom and wide opening on the top so that chopsticks can reach down easily to the bottom. The bowl is to be held by hand while eating. It is necessarily lightweight for everyday use. The alternative way of using these bowls is for cereal. Personally, I like to eat a bowl of rice in the morning, but in American food culture, it is not normal to do so. The color of milk in the bowl creates an attractive contrast with the color of the Shino glaze inside. It makes the food look better and increases one's appetite.

PLATE 6 "*CHAWAN*"

STONEWARE 5½"x5½"x3"

Chicken Soup Bowls

Soup bowls are usually wooden in Japan, since you are supposed to hold the bowl and drink hot soup out of it. Wooden bowls have less conduction ratio than ceramic bowls. No spoon is used for eating soup. On the other hand, in western culture, soup bowls are usually made of ceramic material, since there is no need to hold the bowl. Since I have lived in the United States, I have found it enjoyable to make and eat chicken soup. My chicken soup bowls are intended for chicken soup but can be used for other soups. The rim of the bowl is thick so that you are not able to drink soup by putting your mouth on the bowl. In Japanese food culture, it is good for serving *Nimono* (simmered dish). *Nimono* is the type of dish that has had roots in Japan for at least five decades. Often *Nimono* is referred as *Ofukuro no aji* or mother's dish. The recipe has been handed down for generations.

PLATE 7 “CHICKEN SOUP BOWLS

STONEWARE 6½”x5¾”x2½”

Dessert Bowls

Eating a bowl of ice cream after dinner is relaxing. My dessert bowl is relatively shallow and wide but still holds liquid. The inside of the bowl is glazed and very smooth. In the process of producing, I use a metal rib to get rid of bumps inside of the bowl. It is easy to scoop a bite of ice cream out of the bowl. The spoon will move flawlessly from the bottom to the top. It is ideal for ice cream, gelatin dessert, and pudding. These bowls are stacked and fired rim to rim. When they are stacked this way, they look like a clam.

PLATE 8 “DESSERT BOWLS”

STONEWARE 7”x7”x2”

Green Tea Ware

Yuzamashi (Water Coolers)

Yuzamashi, which literally means "cooling hot water," is used to cool the boiling water since it is too hot for green tea. The boiling water from a kettle is poured into the *yuzamashi* to cool down to approximately 80ºC (175º F). The temperature of the water to brew green tea is in inverse proportion to the quality of the tea. A higher quality tea requires lower brewing temperature. In America, loose-leaf green tea is not very common, and there is no need to use the water cooler to make other kinds of tea. However, the spouted shape of the water cooler is suitable for pouring any liquid. The alternate method of use for these water coolers is as gravy boats. The amount of gravy usually made will fit in the water cooler perfectly.

PLATE 9 "*YUZAMASHI*"

STONEWARE 5"x7"x4" (VARIABLE)

Kyusu (Teapots)

Kyusu is a relatively small teapot that is used to brew green tea. Green tea is the most preferred type of tea drunk regularly. Even though coffee was brought to Japan and has been received well, green tea is still a more popular drink in Japan. Teapots are used and stored just like other dishes. It is important that the teapot pours well, can be cleaned easily, and is comfortable to hold. The user is to hold the side-knob-handle with the right hand. The index finger is placed on the knob of the lid when tea is poured to prevent the lid from falling and the tea is poured toward oneself by twisting the wrist. The distance between the handle and the lid is important for comfort.

PLATE 10 "*KYUSU*"

STONEWARE 7"x6"x5½" (VARIABLE)

Yunomi (Teacups)

Yunomi is the word for green tea cup although it literally means “drinking hot water.” It is just like using *chawan,* where each person uses his or her own favorite cup. My criteria for cups are that they are relatively small, that they hold at least 150 ml of tea, and that they are skinny so they are easy to pick up. Also it is necessary that they feel comfortable in the user’s hand. They have a trimmed foot to prevent burning while they are used. The insides of the cups are glazed with a Shino glaze. As the teacups are used, green tea will stain the crazing in the glaze. The owners of the cups can enjoy the changes in the cups as they continue using it.

PLATE 11 "*YUNOMI*"

STONEWARE 3½"x3½"x3¾"

Drinking Vessels

Coffee Mugs

Coffee mugs are one of my favorite things to make. I always enjoy a cup of coffee and I use coffee mugs more than any other pottery. The smell of coffee and the taste of coffee make me feel relaxed. My coffee mugs have handles since coffee is brewed and served close to boiling temperature. I attempt to put a comfortable two-finger handle because I think that the balance between the size of the mug and the handle is best with two-finger handle. There will not be any contact against the mug when it is held so that you will not burn yourself. My coffee mugs are big enough to hold twelve oz of coffee.

PLATE 12 “COFFEE MUGS #1”

STONEWARE 4½”x 3½”x4”

PLATE 13 “COFFEE MUGS #2”

STONEWARE 5”x3½”x4½”

Tumblers

Tumblers may be used to serve iced beverages such as water, juice, sweet tea, and soda. Although bottled green tea, oolong tea, or other types of tea can be purchased anywhere in Japan, my tumblers are suitable for serving these unsweetened bottle teas.

My tumblers are made tall and skinny. Tall and skinny work is always desired for a wood-firing. When work is loaded in the kiln, there are always gaps that cannot be filled with wide items. Tall and skinny pots such as tumblers are used as space fillers. A metal rib is used to create a swirl from the bottom to the top on the wheel. This is not only a decorative accent but also works functionally. When the user holds it, their fingers fit into the grooves. It provides a firm grip and feels comfortable. In addition, the grooves will collect ash in the wood kiln. This will create subtle changes on the surface.

PLATE 14 “TUMBLERS”

STONEWARE 3½”x3½”x6” (VARIABLE)

Plates

Dinner Plates

Dinner plates are made with slight curve so that it can hold small amounts of liquid without spilling. They are commonly used in the United States. Several kinds of foods including entrées and sides are typically served on the same plate. In contrast, in Japan, this size of plates is not used for serving individuals. They are used for the food shared by everyone at the table.

The plates are not glazed for stacking in the kiln so they can be stacked in the kiln. By stacking them, they take less space in the kiln and use less kiln shelves. I can use the extra shelves and room for other work. Stacking does not always bring good results because warping sometimes occurs. Clay gains fluidity at high temperatures and warps according to gravity and pressure. To avoid warping, wadding is placed on the same spots of each plate and stacked. When the stack of plates is seen from the side, the wadding should line up vertically. The plate on the top of the stack is placed upside down to avoid getting too much ash on the eating surface. However the atmospheric nature of the wood kiln glazes its eating surface.

PLATE 15 “DINNER PLATES”

STONEWARE 10¼”x10¼”x1”

Sandwich Plates

Sandwich plates are just big enough to put a sandwich and small sides. These plates are glazed except for the rim to stack rim to rim. They are also suitable for breakfast foods, such as bacon, eggs, sausages, or other foods that do not require sauce or syrup. Another option for these small pates is for grilled fish. Since the size of dinner plates is too big for serving individuals and seldom used in Japan, small plates are more common on a dining table. My sandwich plates will be suitable for serving grilled fish.

PLATE 16 “SANDWICH PLATES”

STONEWARE 8½”x8½”x½”

Bottles

Flower Bottles

I had been surrounded by a lot of flowers and plants while growing up in Japan. There were always flowers around home because my mother teaches flower arrangement. Having flowers and plants in home will create an opportunity to relax. The smell and color of flowers and plants are refreshing physically and mentally. My flower bottles are small and can go on a table. These wood fired flower bottles with some flowers or tree branches, such as Japanese maple, will bring light into the home.

PLATE 17 “FLOWER BOTTLES”

STONEWARE 5”x5”x7”(VARIABLE)

CONCLUSION

This research began with making the suitable clay body for wood-firing. Choosing the right clay body for wood-firing was crucial for this thesis. Clay body is to have the various colors and the natural-ash-glazed surface to accompany with the various colors of foods. After repeated trial and errors, I chose the clay body that works for this thesis. Understanding the characteristic of the clay and wood-firing, I was able to produce the simple but ergonomically designed wood-fired work that can be used on a daily basis. My utilitarian work will improve its users' daily experiences through the use. In conclusion, I found that my wood-fired work crosses the boundary of Japanese and American food cultures by finding similarities in use. Being aware of the differences, two different cultures are bridged through using my wood-fired work that works with both Japanese and American food.

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APPENDIX A: GLOSSARY

Anagama: An ancient type of wood kiln with a single chamber.

Bizen: A pottery town in southeastern Okayama Prefecture. It is known for reddish-brown pottery from the iron rich clay mined around the area.

Ball clay: A high plasticity clay used in clay bodies and glazes.

Cord: A measurement of stacked wood. One cord is one hundred and twenty-eight cubic foot.

Crawling: A common glaze defect. The molten glaze becomes like the surface of a brain.

Crazing: Fine cracks on the glaze surface. This is from the shrinkage difference between the clay and the glaze. It occurs when the glaze shrinks more than the clay.

Echizen: A town located in Fukui Prefecture. Echizen is an old name used for the Fukui area. It is known for large-sized pottery that is coil-built.

Firebox: The area in the kiln where firewood is introduced.

Feldspathic rocks: Rocks that contain feldspar, including granite. When included in the clay body, it melts and leaves white or translucent semicircular dots on the surface.

Flashing: An atmospheric reaction that causes the clay to turn earthy colors such as brown, red, pink, or orange.

Helmer Kaolin: A type of kaolin mined in Idaho that is higher in iron than other types of kaolin. It is known as a flashing component in clay bodies or slips.

Kiln shelf: A board made of high refractory materials. Work is loaded onto kiln shelves to be fired in a kiln

Kinoubi: A concept of Japanese art which equates function with beauty. The beauty is derived from pursuing functionality.

Kyusu: A Japanese word for teapot. In general, *kyusu* refers to a green tea teapot.

Nepheline Syenite: A substance used as a flux in clay bodies and glazes. It consists of Nepheline and alkaline feldspar.

Noborigama: A type of wood kiln built on a slope, also called a climbing kiln. It has multiple chambers, each with a firebox.

Oxidation: A kiln where oxygen is abundant and complete combustion of fuel occurs.

Pyrometric cone: A two-inch pyramidal-shaped material formulated to bend at a specific temperature in the kiln. Several different cones are used to know the temperature of the kiln.

Reduction: An atmospheric environment in the kiln caused by incomplete combustion. When excess fuel is introduced into the kiln, there is not enough oxygen from the air and carbon monoxide molecules from the incomplete combustion remove oxygen atoms from oxides in the clay and glazes. Reduction affects the color of the clay and glazes.

Seto: A pottery town located in Aichi Prefecture that boasts a variety of styles, including wood-fired ware, glaze-fired ware, stoneware, and porcelain.

Shigaraki: A pottery town in Shiga prefecture known for its coarse clay body that does not vitrify easily. A long wood-firing in Shigaraki was developed to fire Shigaraki clay to its maturity.

Shino: A type of glaze that originated in Japan. Different types of Shino glazes have been developed in both in Japan and the United States. Shino ranges from creamy white to orange, and matte to shiny.

Side-stoking: Introducing firewood into a small firebox located in the middle to the back of the kiln. By creating another source of heat, work loaded in the back can be fired at a higher temperature.

Sutema: A space separate from the ware chamber, located in the back of the kiln. It stabilizes the firing.

Tanba Tachikui: A pottery town located in Sasayama, Hyogo Prefecture. Tanba is the old name for the region, and Tachikui is the specific name of the town. It is known for its use of *noborigama*.

Tokoname: A pottery town located in Aichi prefecture known for its unglazed shiny teapots that are reddish-brown.

Vitrification: The transformation of clay and glaze into glass at high temperatures. Clay and glazes are vitrified when they are fired to maturity.

XX Saggar: A type of ball clay mined in Kentucky. It is known as a flashing component in clay bodies for wood-firing.

Yuzamashi: A spouted and handled vessel used to cool boiling water.

Yunomi: The Japanese word for a teacup used for green tea.

APPENDIX B: CLAY BODY RECIPE

Goldart.....50 lbs

XX Sagger.....50 lbs

Helmer Kaolin.....25 lbs

Nepheline Syenite..... 25 lbs

Hawthorne Fire Clay.....25 lbs

Grog.....10 lbs

APPENDIX C: FIRING LOG

This firing log is based on one of the firings that took place in the spring semester of 2011. Participants of the firing were asked to record the log.

Cones 08, 04, 1, 4, 6, 7, 8, 9, 10, and 11 were used for the side. Four cone packs with these cones were made and placed on the right and left sides in the middle and back of the kiln. The locations of these cones are written as “middle right,” “middle left,” “back right,” and “back left,” in this appendix.

Cones 08, 04, 1, 4, 6, 7, 8, 9, 10, 11, 12, 13, and 14 were used for the front. Four cone packs were prepared with these cones. These cone packs were placed in the top and bottom right and left of the front. These are shown as “front bottom right,” “front bottom left,” “front top right,” and “front top left.”

Thursday

9:45am	Start of the firing. A small bonfire is going to be kept in the firebox and a bigger fire is kept in the chimney for eight hours. Warming the chimney will draw more air from the front.
6:00pm	Maintaining bonfires in the chimney and the front firebox until midnight. Stoking two pieces of wood when previous pieces are almost used up. Stoking the chimney first, and then the front a few minutes later. Stirring coals to spread the coals to the back of the firebox.

Friday

12:00am	There are bats! Two to four pieces of wood are stoked every ten to fifteen minutes depending on the size until 4:00 am. The wood is stoked into the chimney first and then the front.
5:00am	Dancing! Two to three pieces every ten to fifteen minutes.
6:00am	Stoking wood every ten minutes. Raising the temperature slowly.
8:00am	A little bit bigger stoke almost every five minutes. Chimney bonfire is still kept going.
9:00am	Stoking wood into the chimney is now stopped. An additional piece of wood is added to the front stoke.

11:00am	Spreading the coals in the front firebox.
12:00pm	Stoking rhythm is kept the same until 6pm
6:45am	The front of the kiln is getting hot too rapidly. Front stoking is slowed down to every 10 minutes.
8:30pm	Stoking wood more often again. The back of the kiln is pretty warm. Building up a good pile of coals in the firebox.
10:15pm	Two primary air holes are opened in the front. The coals are built up nicely. Work is glowing in the front.
10:45pm	Cone 08 in the front bottom right and left are down.
10:50pm	The middle part of the kiln is getting hot and the flame from the front can be seen. Air holes on the side are opened. Side-stoking started.

Saturday

12:55am	Next cones (cone 04) are soft at the front bottom right and left. Four to five pieces of firewood are stoked in the front every five minutes. Two pieces are side-stoked.
2:40am	Six to seven pieces are stoked every five minutes in the front firebox. Two to three pieces depending on the size are side-stoked.

2:45am	Three cones in front bottom right and left are down. Cone 08 on the middle right and left is getting soft. First cone (cone 08) on the side is getting soft.
3:00am	More stoking. Cone 08 in the middle right and left is down completely.
4:15am	Second cones (cone 04) in the middle left and right are soft.
4:40am	Stoking six to eight pieces into the front firebox. Two to three pieces are stoked in the side every ten minutes.
5:05am	Second cone (cone 04) is down in the middle left.
5:30am	Two more holes in the front are plugged with bricks. Still stoking six to eight pieces about every five minutes. Two to three pieces are stoked in the side.
6:15am	Stoking rhythm is kept the same.
6:30am	Increasing the amount of wood for the side-stoking.
6:50am	Third cone (cone 1) soft in the middle left. Middle right needs to catch up.
7:30am	Stoking more frequently. Cone 6 in the front is still up.
9:00am	Cone 6 in the front bottom right and left is bending. Cones 08, 04, 1, and 4, on the front top right and left are down.
10:00am	Opening two more primary air holes. Now six primary air holes are open. Cones 7 and 8 in the front top right are bending. Cone 9 on the front top left is down. Cone 9 on the front bottom left is down and the right is soft.

10:15am Too much air is going through the coals and raising the temperature too fast. To slow down, two more primary air holes are shut. Now four primary air holes are open in addition to the four secondary air holes.

10:30am Cones 7 and 8 on the front top left are still bending. Maintained the temperature for the past 30 minutes.

10:50am More primary air holes are closed. Now the opening is one third of a hole on the bottom two holes. On the middle right, cone 4 is down and cone 6 is bending.

11:30am Cones 7 and 8 are bending on the middle right. Cone 10 is bending on the front bottom left and soft on the front bottom right. Cone 9 is soft on the front top right and left.

1:15pm Cone 9 is soft on the middle right. Cone 5 is soft in the back right.

4:00pm Cones 11, 12 and 13 seem to be going together in the front bottom right. Cone 11 on the front bottom left is halfway down. It seems like too much wood was stoked to the side. Bricks are removed to let more air in.

5:30pm There is a good sign. Cone 5 on the back right is going down. Cone 9 in the middle right is halfway down and cone 8 in the middle left is halfway down. Wood has been stoked in the side first and then stoked to the front. Three to four pieces are stoked in the side and six to ten pieces in the front. The coals in the front firebox are kept high to maintain the heat in the kiln.

6:15pm Two more primary air holes are opened to push the firing. Skinny pieces of wood are fed through the primary air holes. This will raise the temperature quickly.

10:40pm Cone 9 on the middle right is bending.

11:20pm Two primary air holes are closed again. The front of the kiln is getting too hot.

Sunday

4:00am Cone 13 in the front bottom right and left and top right and left is down. Cone 10 on the middle right and left is down. Cone 10 in the back right and left is soft. The kiln will be held at this temperature until the people on the next shift come.

8:00am A few pieces of wood are introduced into the side-stoking holes. Ten pieces of wood are stoked into the front firebox. We have to wait a few minutes for the atmosphere of the kiln to clear in order to shut it down. While waiting, a bucket of sloppy clay is prepared to seal any gaps. The inside of the kiln is observed and we make sure that the atmosphere is clear. The stoke hole in the front is plugged with soft bricks. The holes on the side of the kiln are shut. Primary and secondary air holes are plugged with bricks. Any small gaps are plugged with the clay. The damper is shut and the holes on the top of the kiln are shut. All openings on the kiln are closed. Letting the kiln cool down very slow is as

important as the firing. Now it is time to go home and sleep. Being patient until the unloading day is hard.

APPENDIX D: PYROMETRIC CONES AND CORRESPONDING TEMPERATURE

(From: The Edward Orton Jr. Ceramic Foundation.)

Heat rate is at 108ºF/hour

Cone 08: 1728ºF

Cone 04: 1940ºF

Cone 1: 2077ºF

Cone 4: 2120ºF

Cone 6: 2228ºF

Cone 7: 2259ºF

Cone 8: 2277ºF

Cone 9: 2295ºF

Cone 10: 2340ºF

Cone 11: 2359ºF

Cone 12: 2379ºF

Cone 13: 2410ºF

Cone 14: 2530ºF